**Basic Trigonometry**

**Basic Trigonometry**

Throughout this course you will be required to dig deep back into that region of your mind that filed away knowledge from your high school mathematics classes.  Triangles and their properties and functionality are absolutely key in much game mathematics and therefore I would like to give you a very quick refresher on the rules and such before you begin.

**Angles**

An angle is a figure formed by the intersection of two lines.  There are three basic types named because of their relationship to 90 degrees.

A black background with a black square

AI-generated content may be incorrect.

Angles less than 90 degrees are called ***acute***.  When a line meets another line at 90 degrees the lines are called ***perpendicular*** to one another.  This is usually denoted by drawing a little square box in the corner. Another word also used to mean perpendicular is ***orthogonal***.   Angles greater than 90 degrees are called **obtuse.**

**Triangles**

There are three basic types of triangles; scalene, right angled and isosceles.

A black background with a black square

AI-generated content may be incorrect.

A ***scalene*** triangle has no sides of the same length.  An ***isosceles*** triangle has two sides of the same length.  A ***right angle*** triangle (the one that provides us with the most power in game mathematics, has one interior angle that is 90 degrees.  It is always denoted by the drawing of a little square box in the corner that is 90 degrees.

*All interior angles of a triangle add up to 180 degrees.*

**Properties of Right Angle Triangles**

A black background with white dots

AI-generated content may be incorrect.

A right angle triangle has three sides denoted the hypotenuse for the longest side (the side opposite the right angle) and two others known as the adjacent or opposite depending on their relationship to the angles.  For example, for the angle **β**, **b** would be opposite and **a** would be adjacent.  For the other angle the roles of a and b would be reversed.

The nice thing about a right angle triangle is that you can calculate all the interior angles if you know the lengths of a, b and the hypotenuse.

The formula are:

A black text with black letters

AI-generated content may be incorrect.A black and white math equation

AI-generated content may be incorrect.A math equation with black text

AI-generated content may be incorrect.

For example, let's say a = 3 and the h (hypotenuse) is 6.  With these values we can work out angle for **β**as we have it's adjacent side and the hypotenuse.  Therefore:

A black text on a white background

AI-generated content may be incorrect.

This equates to cos(β) = 0.5.  To calculate this you must use the inverse cosine of 0.5 thus:



If you don't have a calculator handy you can type =acos(0.5) into Google and it will give you the answer.  Notice to get the inverse of a cosine function we can use the function acos().  There is a similar one for sine which is asin().

A number with a cat symbol

AI-generated content may be incorrect.

Google tells us that the acos of 0.5 is 1.042 radians.  To convert this to degrees multiply by 180/PI.  This will give the **angle of β to be 60 degrees**.  Is this value correct?  Well you can check by looking at the triangle itself.  If you have a protractor you could actually measure it.  In this case β looks to be 60 degrees and when I hold a protractor up to it, it is indeed 60 degrees.

Course content

AI Assistant

**Beta**